

PATENT ABSTRACTS OF JAPAN

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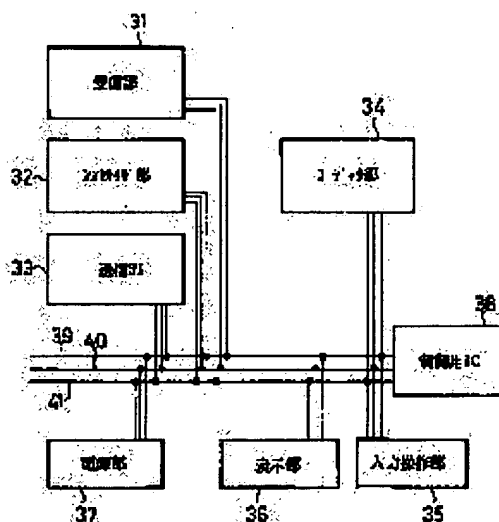
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(54) PORTABLE TERMINAL EQUIPMENT

(57)Abstract:

PURPOSE: To attain miniaturization and light weight by providing a bus for sending a control signal and stopping the transmission through the transmission bus when the portable terminal equipment receives a data.

CONSTITUTION: Out of a data of a control signal to be sent from a control section 38 to a reception section 31, a synthesizer section 32, a transmission section 33, a CODEC section 34, an input operation section 35, a display section 36 and a power supply section 37, a data is sent through a data line 40, address information of the data is sent through an address line 41, and control information of the data for read/write or the like is sent through a control line 39. On the other hand, a control signal sent from each of sections 31-37 receiving the signal from control signal transmission buses 39-41 to the control section 38 is similarly sent. In this case, the control section 38 stops the transmission of the control signal for a reception time slot and sends the control signal for a time other than the reception time slot by controlling the buses 39-41. Through the constitution above, number of wires for the control signal is reduced and small size and light weight are attained.



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DETAILED DESCRIPTION

[Detailed Description of the Invention]

[0001]

[Industrial Application] This invention relates to personal digital assistant equipment, and relates to the technique which miniaturizes the personal digital assistant equipment concerned especially.

[0002]

[Description of the Prior Art] While the spread of portable telephones progresses in recent years, the need of the miniaturization of the body of equipment and lightweight-izing is increasing. Drawing 8 is the block diagram showing the configuration of the portable telephone in the former, is divided roughly into an antenna 1, a receive section 2, the transmitting section 3, the synthesizer section 4, control IC 5 and a power supply section 6, the voice codec IC 7 and the display & LCD driver 8, a dial switch 9, and a loudspeaker 22 and a microphone 23, and is constituted.

[0003] Moreover, a receive section 2 takes out the original signal from the signal received with the antenna 1, and consists of the receiving filter 10, a 1st intermediate frequency filter 11, a channel selection filter 12, and IC13 for reception and a frequency discriminator 19.

[0004] The transmitting section 3 modulates a sending signal, outputs it from an antenna 1, and consists of a transmitting filter 14, high power amplifier 15, and a quadrature modulation machine IC 16.

[0005] The synthesizer section 4 outputs the reference signal for performing frequency conversion, and has VCO17 and PLLIC18.

[0006] The voice codec IC 7 changes a digital signal and a sound signal.

[0007] Control IC 5 controls each device mentioned above in the gross, and is connected with each device by the control signal lines 24a-24h.

[0008] Although every one straight line 24a-24h shows the connection between control IC 5 and each device by drawing 8 at this time About 3 and path cord 24b with a receive section 2 in fact path cord 24a with a power supply section 6 About 25 path cord 24c with the synthesizer section 4 -- the path cords 24d and 24e with about 25 and the transmitting section 3 -- 24f of path cords with about 25 and a dial switch 9 -- 24g of path cords with about 15 and the display & LCD driver 8 -- about ten -- and 24h of about 15 path cords with the voice codec IC 7 is required. Therefore, the total number of the control signal line connected with control IC 5 attains to about 120, and when attaining a miniaturization, it will become a big obstruction.

[0009] Moreover, at terminals for mobile communication, such as a cellular phone, in order to transmit and receive a signal through wireless, the noise to the analog circuit sections, such as a receive section and the transmitting section, becomes a very big performance degradation factor. For this reason, it is necessary to eliminate the noise source inside equipment as much as possible. However, the control signal transmitted in the control signal lines 24a-24h was usually a digital signal, and since the configuration was a configuration very near a square wave or a square wave, the digital signal had become a big noise source over an analog circuit.

[0010] Therefore, in the conventional terminal for mobile communication, the distance of an analog circuit part and the control line was taken, or the device was needed for the method of wiring of the

control line, such as shielding to the control line. Moreover, the transmission speed of a control signal needed to be set up according to the individual to all the control lines so that it might not increase the integral multiple of received frequency, a local dispatch frequency, or the frequency used inside others, or 1 time for an integer, and when attaining a miniaturization, it had become a big obstruction also from such a point.

[0011]

[Problem(s) to be Solved by the Invention] Thus, in the conventional portable telephone, since the device for removing the noise from the digital signal which needs the control signal line which attains to no less than the total 120 numbers, and is transmitted in this control signal line was required, there was a trouble that a miniaturization was very difficult.

[0012] Moreover, the digital signal was transmitted using the high speed bus used by calculating machines, such as a personal computer, and although the method of reducing the number of wiring was also considered, since the high speed bus became a mighty noise source by this approach, there was a fault of having big effect on a reception function.

[0013] The place which it was made in order that this invention might solve such a conventional technical problem, and is made into that purpose is to offer the possible personal digital assistant equipment of a miniaturization.

[0014]

[Means for Solving the Problem] In order to attain the above-mentioned purpose, it is the description that this invention has the bus which performs control signal transmission in the personal digital assistant equipment concerned, and a means to stop said control signal transmission at the time of data reception, in the personal digital assistant equipment used for mobile communication.

[0015]

[Function] If constituted like ****, transmission of a control signal will come to be performed through the bus for signal transmissions. Moreover, when the personal digital assistant equipment concerned has received data, it is controlled so that transmission by the bus for transmission stops. Therefore, since many wiring is not needed and it is not influenced of a noise, small / lightweight-ization is attained.

[0016]

[Example] Drawing 1 is the block diagram showing the configuration of the 1st example of the portable telephone with which this invention was applied. In this drawing, a control section 38 controls the telephone concerned in the gross, and is connected with a receive section 31, the synthesizer section 32, the transmitting section 33, the codec section 34, the display 36, the power supply section 37, and the input control unit 35 through three buses for control signals, the control line 39, the data line 40, and the address line 41.

[0017] After amplifying the signal received from the antenna (un-illustrating), a receive section 31 does frequency conversion, drops and gets over to a baseband frequency, and takes out the original signal.

[0018] After the transmitting section 33 modulates a digital signal, it makes a frequency high and is made to emit it from an antenna.

[0019] The synthesizer section 32 outputs the reference signal at the time of performing frequency conversion in a receive section 31 and the transmitting section 33.

[0020] The codec section 34 changes into a digital signal the sound signal inputted from the microphone (un-illustrating) while changing the received digital signal into a sound signal.

[0021] Moreover, a display 36 carries out a screen display of the required information, the input control unit 35 incorporates the actuation signal from an operator, and a power supply section 37 supplies power to each device mentioned above.

[0022] Next, actuation of this example is explained. In addition, in order to simplify the following explanation, a receive section 31, the synthesizer section 32, the transmitting section 33, the codec section 34, the input control unit 35, a display 36, and a power supply section 37 are named generically, and it is called "each part 31-37."

[0023] Now, control information, such as the address line 41, and read-out/writing, is transmitted for the address information as which data specify the destination of the data line 40 and data by the control line

39 among the control signals transmitted to each part 31-37 from a control section 38.

[0024] On the other hand, the control signal transmitted to a control section 38 as well as the above is transmitted from each part 31-37 which received the signal from the buses 39-41 for control signal transmission.

[0025] At this time, a control section 38 stops transmission of a control signal at the time of a receiving time slot, and controls the buses 39-41 for control signal transmission to transmit a control signal to time amount other than a receiving time slot.

[0026] For example, when using a 4 multiplex TDMA method as a communication mode, as shown in drawing 6, the 1st slot - the 4th slot are repeated with a predetermined time interval. And when the receiving slot of the portable telephone concerned is the 1st slot, it is controlled so that transmission of a control signal stops only the period of the 1st slot.

[0027] For this reason, since transmission by the buses 39-41 for control signal transmission which are the radiation sources of a mighty noise stops at the time of reception, trouble is not given to a communication link.

[0028] Moreover, when using a TDD method as a communication mode, as shown in drawing 7, a receiving slot and a transmitting slot are repeated by turns with a predetermined time interval. And transmission of a control signal is suspended at the period of a receiving slot, and the period of a transmitting slot is controlled so that transmission of a control signal is performed.

[0029] For this reason, like the above mentioned TDMA method, since transmission by the buses 39-41 for control signal transmission stops at the time of reception, trouble is not given to a communication link.

[0030] Moreover, since it is not necessary to form the control line which attains to 120 like before and transmission of a signal is performed using three buses 39-41 for control signal transmission according to such a configuration, small [of the body of a portable telephone] and lightweight-ization can be attained.

[0031] Drawing 2 is the block diagram showing the configuration of the 2nd example of this invention. In this example, the receive section 31 which constitutes the portable telephone concerned, the synthesizer section 32, the transmitting section 33, the codec section 34, the input control unit 35, the display 36, the power supply section 37, and the control section 38 have the serial/parallel-conversion sections 31a-38a, respectively.

[0032] The serial/parallel-conversion sections 31a-38a restore the supplied serial signal to the original parallel signal while they multiplex control information, such as address information which specifies the destination of data and data, and read-out/writing, by time sharing and send it out to the serial bus 42 for control signal transmission as a serial signal. And other configurations are the same as that of the 1st above mentioned example, and the period of a receiving slot is controlled so that the serial bus 42 for control signal transmission stops.

[0033] With such a configuration, transmission of all signals is attained only by serial bus 42, and it becomes still more advantageous to lightweight[small /]-izing.

[0034] Drawing 3 is the block diagram showing the 3rd example of this invention, and is arranging the clock wiring 43 from the control section 38 to a receive section 31, the synthesizer section 32, the transmitting section 33, and the codec section 34. By this, a receive section 31, the synthesizer section 32, the transmitting section 33, and the codec section 34 can acquire an always exact clock signal irrespective of a time slot. Consequently, exact actuation can be performed, without causing a clock gap.

[0035] Drawing 4 is the block diagram showing the 4th example of this invention. In this example, a signal is transmitted using the serial bus 42 between a receive section 31, the synthesizer section 32, the transmitting section 33 and the codec section 34, and a control section 38, and a signal is transmitted with the signal line 44 wired according to the individual as usual between a power supply section 37, a display 36 and the input control unit 35, and a control section 38.

[0036] In this case, since there are few numbers of the signal line 44 which connects a power supply section 37, a display 36, and the input control unit 35 and a control section 38, small / lightweight-

ization can be attained.

[0037] Drawing 5 is the block diagram showing the 5th example of this invention. In this example, RAM 31b-38b is formed in a receive section 31, the synthesizer section 32, the transmitting section 33, the codec section 34, the input control unit 35, the display 36, the power supply section 37, and the control section 38.

[0038] RAM 31b-38b memorizes control information temporarily, and memorizes a receipt and its contents for the information needed when transmission of the serial bus 42 for control signals has stopped from a control section 38 beforehand.

[0039] According to such a configuration, each part 31-37 can acquire information required for the period which transmission of the serial bus 42 has stopped, and can transmit an exact signal.

[0040] Moreover, in the 1st - the 5th example which were mentioned above, if it sets up to each frequency of received frequency, the reference signal oscillation frequency in the synthesizer section 32, and the oscillation frequency of the voltage controlled oscillator in the synthesizer section 32 so that the transfer rate of the digital signal by the bus for control signal transmission may not serve as 1 or the integral multiple for an integer, the effect by the noise can be reduced more.

[0041] In addition, although the example mentioned above explained the portable telephone, this invention is not limited to this, for example, of course, it can apply also in other personal digital assistant equipments, such as a pocket computer.

[0042]

[Effect of the Invention] As explained above, when the control signal is transmitted using the bus for control signal transmission and the portable remote terminal equipment concerned has received data, this transmission is stopped in this invention. Therefore, as compared with the former, the wiring number for control signals can be reduced remarkably, and the effect by the noise can be avoided. Consequently, the effectiveness that small / lightweight-ization is realizable is acquired.

[Translation done.]